DEVELOPING PHYSICAL FITNESS EVALUATION CRITERIA

Leading Community Risk Reduction

Developing Physical Fitness Evaluation Criteria for the Hartford Fire Department

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: _____

ABSTRACT

The problem was the Hartford Fire Department's punitive physical fitness evaluation system did not promote physical fitness within the department. The purpose of the research was to develop and produce criteria for a comprehensive physical fitness evaluation system that could be used to promote physical fitness. Action research was conducted to answer the questions regarding National, State, and Local criteria as well as criteria used by similar sized departments. A literature review was conducted on physical fitness evaluations. Personal interviews were held with the stakeholders and with the Department's fitness trainers. The results indicated the IAFF/IAFC Joint Labor Management Wellness – Fitness Initiative would be most beneficial, and the recommendation was to adopt the fitness evaluation outlined in this Initiative.

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INTRODUCTION

There can be little disagreement with the opinion that firefighting is one of the most dangerous and stressful occupations. Firefighters are under the constant threat of responding to a multitude of emergencies, and once summoned they must quickly act in order to protect lives and property. Tragically, an average of 100 firefighters nationally lose their lives each year in the course of performing their duties and the majority of these die from heart related causes (Federal Emergency Management Agency [FEMA], 2002). In fact, “firefighters as a group are more likely than any other American worker to die of a heart attack while on duty” (FEMA, 2002, p.25).

The successful response to these hazardous and often highly disturbing incidents requires trained personnel who are physical fit and mentally capable of performing their duties. This is necessary in order to ensure that the emergency is successfully mitigated and that the responders return home safely.

The research problem is that the Hartford Fire Department’s current punitive physical fitness evaluation system does not promote physical fitness within the department.

The purpose of this research is to develop and produce criteria for a comprehensive physical fitness evaluation system that can be used to promote physical fitness within the Hartford Fire Department.

Action research will be conducted to answer the following questions:

1. What are the National criteria for firefighter fitness evaluations?
2. What are the State and Local criteria for firefighter fitness evaluations?

3. What are the criteria that departments of similar size use to evaluate physical fitness?
4. What are the criteria for firefighter fitness evaluations that the Hartford Fire Department should consider implementing?

BACKGROUND & SIGNIFICANCE

The Hartford Fire Department (HFD), a combination department comprised of eighteen career and six paid on call employees, provides fire, emergency medical, technical rescue, and hazardous materials services to the Town of Hartford, Vermont. The Town of Hartford is a rural community with a population of 10,367 that is located on the State's eastern most border (U.S. Census Bureau, 2001). The HFD operates out of two stations; only the main station is staffed with career firefighters. The total response area covers 39 square miles. The Hartford Career Firefighters Association, Local 2905 of the International Association of Fire Fighters, is the exclusive bargaining agency, which represents 16 of the 18 career firefighters.

Article 20.4 of the collective bargaining agreement between the Town of Hartford and the Hartford Career Firefighters Association (Union) requires, "employees shall, as a condition of employment, be required to maintain themselves in satisfactory physical condition in compliance with published physical agility standards mutually adopted by a committee of two Union representatives and the Fire Chief" (Town of Hartford, 2004, p.15). In order to meet this provision, each year the Department administers a physical agility exam to all firefighters covered under the contract. The exam is based on the published physical agility standards established by the Department and the Union. The firefighter must pass all aspects of the exam. If a firefighter fails any component of the exam, then he/she must retake the entire exam.

Employees are given the opportunity of two additional attempts to meet the standard over the next six months. If the employee fails to meet the standard, then he/she will be dismissed.

The current published physical agility standards as shown in Appendix A have been in place for over 15 years, but have little to do with the firefighting occupation. Initially this provision was negotiated into the agreement when many of the Departments' firefighters were young and in good physical condition. As the age of our members has increased throughout the years, the testing process has resulted in more concern for both the department and the employees. This has occurred because each of the past few years at least one employee has failed to meet the standard on either the first or second attempt; resulting in poor moral, apprehension and the fear of discharge. Additionally, the exam has done little to promote physical fitness within the organization. Employees usually start preparing for the exam six to eight weeks before it is scheduled to be administered and stop exercising the day the test is given. Both the Department and the Union agree this is does not meet the objective of having a healthy workforce.

This provision in the contract has been the subject of many discussions between the Town and the Union throughout the years; however, the parties have never been able to agree on a mutually acceptable solution. Other efforts at voluntary fitness programs have been attempted in the past few years; however, due to the lack of participation they too have not been successful.

Recently a change in the Department's administration has resulted in renewed interest in finding a solution to this problem. Both parties agree that a well developed physical fitness program is imperative to ensure the health and safety of firefighters. This directly relates to one of the United States Fire Administrations operational objectives that is to, "Reduce the loss of life from fire of firefighters"(National Fire Academy, 2003, II-2). In addition, identifying,

including, and gaining the support of all stakeholders directly relates to the building support unit of the National Fire Academy's Leading Community Risk Reduction course. This unit encourages leaders to identify and engage all interested parties in order to allow all concerns to be voiced. Additionally, this process often results in solutions that meet the needs of all of those involved (National Fire Academy, 2004).

LITERATURE REVIEW

The literature review for this ARP started during this author's Leading Community Risk Reduction course with a visit to the Learning Resource Center (LRC) at the National Fire Academy in Emmitsburg, Maryland. The LRC on-line card catalog was used to search for relevant publications addressing physical fitness evaluations and firefighter wellness. Internet searches also revealed numerous editorials of interest.

A personal interview was conducted with D.A. Shropshire (October 6, 2005) a certified peer fitness trainer and a Hartford firefighter. Firefighter Shropshire was selected because of his experience as a personal trainer, knowledge of fitness assessments, and his involvement with the HFD fitness program. Firefighter Shropshire believes a physical fitness evaluation system should be based upon strength, endurance, aerobic capacity, and flexibility. Additionally, a minimum fitness standard should be established for all firefighters to achieve.

A personal interview was conducted with C.M. Dube (October 6, 2005) a certified peer fitness trainer and a Hartford firefighter. Firefighter Dube was selected because of his experience as a personal trainer, knowledge of fitness assessments, his work assisting other fire departments with physical fitness, and his involvement with the HFD fitness program. Firefighter Dube also believes a physical fitness evaluation system should be based upon strength, endurance, aerobic capacity, and flexibility.

A personal interview was conducted with M.A. Miller (October 11, 2005) Chief of the Hartford Fire Department. Chief Miller was selected since any change to the current fitness evaluation system would need his support, and his involvement with other fire departments provides valuable insight to a multitude of options. Chief Miller believes that the fitness evaluation system should be non-punitive, flexible, tailored to meet the needs of the individual, and should be targeted at aerobic capacity, strength, endurance, and flexibility.

A personal interview was conducted with J.S. Libbey (October 11, 2005) Vice-President of the Hartford Career Firefighters' Association. Vice-President Libbey was selected as he is the representative of Union. Vice-President Libbey's support is crucial in any proposed change because he speaks for all the fulltime firefighters. Vice-President Libbey believes that the criteria for firefighter fitness evaluations must be approached in a positive light and must be administered consistently. Additionally, Vice-President Libbey believes that there should not be a minimum standard developed, but rather a continued self-evaluation based upon aerobic capacity, strength and endurance.

Multiple national standards have been written and adopted to deal with the issue of physical fitness. These include NFPA Standards 1500, 1582, and 1583. Additionally, this topic is discussed in the Occupational Safety and Health Administration (OSHA) 29CFR1910.134 and 29CFR1910.136 Standards. The following is a summation of each of the applicable standards as it relates to the issue of physical fitness criteria.

According to NFPA 1500 (2002), "the fire department shall develop physical performance requirements for candidates and members who engage in emergency operations" (p.25). Additionally, this Standard requires members to be evaluated annually; and should they fail to meet the required level of fitness, then they are not allowed to perform firefighting duties

until such time when they can successfully meet the fitness requirement. The Standard further outlines that, " the fire department shall establish and provide a health and fitness program…"(p.25), and that the fire department physician shall determine the appropriate fitness standards for the department. The physician's decision is based upon job functions with the purpose of reducing the risk and severity of job related injuries.

NFPA 1582 (2003) states that, "the fitness evaluation shall be conducted on an annual basis" (p.15), and that it will include the following components. An aerobic capacity evaluation using either a treadmill or a stairmill; a body composition test; a muscular strength evaluation testing grip strength, leg strength, and arm strength; a muscular endurance test using both a push-up and a curl-up evaluation; and a flexibility evaluation utilizing the sit and reach method.

Very similar to the previously discussed standards, NFPA 1583 (2000) sets forth that, "fire departments shall require the structured participation of all members in the health related fitness program" (p.6), and that fitness assessments need to be conducted annually. Again, similar to other standards NFPA1583 requires that the fitness evaluation test the components of aerobic capacity, body composition, muscular strength, muscular endurance, and flexibility. However, the Standard also states, "this document is not intended to establish physical performance criteria" (p.4).

NFPA 1583 (2000) further outlines the importance of having a positive, well-supported physical fitness program within the department. The department's members are its most valuable resource, yet often too little attention is placed on their health and well being. Due to the strenuous activities required of the profession, firefighters are at increased risk of soft tissue and bone injury. Increasing the firefighter's level of physical fitness will decrease the chance of injury and improve job performance.

OSHA 29CFR1910.134 (2003) is the Respiratory Standard that requires employers to provide, “a medical evaluation to determine the employee’s ability to use a respirator” (p.1272). The department’s physician conducts the medical evaluation, and no minimum standard is established. The physician is permitted to make the decision based upon his/her opinion.

OSHA 29CFR1910.156 is the Fire Brigade Standard, and it requires employers to ensure that those firefighters who will be engaged in interior structural fire fighting be physically capable of performing the duties they will most likely encounter. While the Standard does not dictate the acceptable level of fitness, it does state, “the employer shall not permit employees with known heart disease, epilepsy, or emphysema to participate in fire brigade emergency activities unless a physician’s certificate of the employees’ fitness to participate in such activities is provided” (¶ 4).

Both NFPA 1582 (2003) and 1583 (2000) Standards state that they should be used in concert with the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative. It is the intention of this initiative to be, “implemented as a positive individualized program that is not punitive” (p.1). According to the initiative it is the stress, physical demands, and the exposure to chemicals and diseases that contribute to the leading causes of firefighter death and disability, which are heart disease, lung disease, and cancer. It is the position of the initiative that a successful fitness program will help employees improve performance, provide better service to their communities, and enjoy more years in retirement.

The IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000) outlines that the firefighting occupation requires a high level of aerobic fitness, muscular strength and muscular endurance in order to be safe and effective. It is the goal of the initiative to simply improve personal fitness, and because of this, “no standards have been established by this

Initiative for any of these areas" (p.53). The fitness evaluation outlined in the initiative is meant to evaluate a firefighter's aerobic capacity, muscular strength, muscular endurance and flexibility with the thought that the each person will improve with the use of a personalized exercise program used in conjunction with the fitness assessment.

The Forest Service, which is an agency of the United States Department of Agriculture (USDA), establishes fitness criteria to ensure the safety of wildland firefighters. The USDA (2002) developed the pack test in order to evaluate the work capability of the firefighters. The pack test measures aerobic capacity, muscular strength and muscular endurance. In addition, the pack test has been broken into three levels and, "all wildland firefighters must meet minimum levels of fitness requirements for the type of duties they are assigned" (¶3).

According to Coleman (1988) a fitness program assessment should document current weight, blood pressure, heart rate, and physical abilities. Specifically, the physical abilities should include an evaluation of sit-ups, push-ups, jumps, handgrip, bench press, and distance run. Coleman further states that fitness levels need to be enforced through counseling or disciplinary procedures.

LeCuyer, (2001), states that when designing a fitness program, a decision must be made whether to evaluate fitness or performance because these are two separate issues. A fitness test evaluates an individual's health, while a performance test is based on an individual's ability to perform his/her duties. Since each test evaluates different criteria, it is important for the organization to determine the goal of its program.

In summation, the review of published materials and personal interviews on physical fitness evaluations provides sufficient information to lead this author to conclude that a change in policy to a non-punitive fitness evaluation system will benefit the Hartford Fire Department and

its employees. This positive approach to physical fitness will help to increase the health and wellness of all firefighters within the organization and should decrease the number of injuries to responders. This makes for a healthier workforce that will continue to serve its community for many years to come.

However, the concerns of those interviewed as stakeholders within the HFD must be considered. Their opinions will have a significant impact on how any agreement is developed, and they have the ability to either ensure the agreement's success or failure. A balance must be struck between the concepts and ideas presented by those who have published national standards, supportive documents and the concerns of the leaders within the department.

PROCEDURES

Definitions of Terms

Fire Service Joint Labor Management Wellness-Fitness Initiative – A collaborative effort between the IAFF, IAFC and ten member departments to develop a suitable fitness program.

International Association of Fire Chiefs – An international organization comprised of chief officers who work to address fire service issues.

International Association of Fire Fighters – An international organization affiliated as a labor group dedicated to advancing the health and safety of career firefighters.

Research Question Procedures

The procedures for this ARP started with a literature search during this author's Leading Community Risk Reduction course with a visit to the Learning Resource Center (LRC) at the National Fire Academy in Emmitsburg, Maryland. The LRC on-line card catalog was used to search for relevant publications addressing physical fitness and firefighter wellness. The HFD's

informal collection of publications was also reviewed to find any published materials relevant to this topic. Internet searches revealed numerous articles of interest.

A review of National Fire Protection Association Standards relevant to firefighter fitness was conducted. These included Standards 1500, 1582 and 1583 specifically. The Standards were reviewed to determine what national criteria had been developed and to establish a baseline objective for the HFD.

The Fire Service Joint Labor Management Wellness Fitness Initiative (2000) produced by the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC) was reviewed to determine the recommended physical fitness evaluation criteria for firefighters. Since the firefighters at the HFD are represented as a local affiliate to the IAFF, this publication provided a set of standards that had been agreed upon by the parent union.

The work capacity test for wildland firefighters, also know as the pack test, developed by the USDA (2002), was reviewed to gather an understanding of the fitness requirements established for wildland firefighters. Wildland firefighting is a demanding occupation that requires a high level of physical fitness very much similar to the difficulty of structural firefighting.

A telephone interview was conducted with J.G. Wood, Director Vermont Bureau of Fire, and with R.C. McLeod, Compliance Program Director, Vermont Occupational Safety and Health Administration (VOSHA) to discuss State and Local criteria for firefighter fitness evaluations. These individuals were selected since the Bureau of Fire is responsible for all firefighter standards and certifications, and VOSHA is responsible for ensuring workplace safety. In addition, VOSHA performs inspections to determine compliance with all State laws as they

pertain to workplace safety. Each interview lasted for approximately 30 minutes, and the following questions were asked:

1. Are you aware of any formal State or Local criteria for firefighter fitness evaluations?
2. What are your thoughts on firefighter fitness evaluations?

In an effort to understand what other public safety agencies in the State of Vermont where doing in terms of physical fitness, a telephone interview was conducted with D.A. Notte, Sergeant, Vermont State Police on August 30, 2005. The interview lasted for approximately 30 minutes, and it surrounded a general discussion of the physical fitness evaluation criteria used by the Vermont State Police. This criterion is for both the incumbents as well as uniformed personnel. Sergeant Notte is in charge of conducting the fitness evaluations on all personnel.

A personal interview was held with J.A. Estey, Chief, Hartford Police Department on October 24, 2005, at the Hartford Police Station. The interview lasted for approximately 30 minutes, and Chief Estey was asked, “What is the physical fitness criteria used by the Hartford Police Department.” Chief Estey was selected due to his long tenure in the public safety field, and that consistency within the Town of Hartford public safety organizations would be beneficial to any fitness programs success.

A telephone interview was conducted with R.L Eppley, Chief, Vermont Air Guard Fire Department on October 25, 2005. Chief Eppley was selected to gain an understanding of the firefighter physical fitness evaluation criteria used in a military organization, and the interview last for approximately 30 minutes. The Vermont Air Guard Fire Department is on a military installation; however, the firefighters are civilians and are employees of the State of Vermont.

In order to determine the criteria used by similarly sized departments to evaluate physical fitness a survey was sent to 50 departments located in four of the New England states. The survey was restricted to this area since the majority of these departments and their members are covered by a collective bargaining agreement, and many of the issues surrounding their contracts would have already been addressed. A copy of the cover letter is located in Appendix B, and a copy of the survey is located in Appendix C. The questions on the survey were developed to provide insight into what criteria is being used to evaluate firefighter fitness, and the survey was distributed via the U.S Postal Service. Respondents were requested to return the survey within 3 weeks of its distribution. The survey respondents were selected by comparing population estimations provided by the U.S Census to determine similar sized communities, and then sources were checked to ensure each had fulltime fire suppression personnel. A total of 37 surveys were returned, and a list of those departments to which the survey was sent can be found in Appendix D.

Personal interviews were conducted with M.A. Miller, Chief of the HFD, and with J.S. Libbey, Vice-President of the Hartford Career Firefighters Association on October 11, 2005. These individuals were chosen since their acceptance of any recommended criteria would be crucial to the programs success. Each of the interviews was conducted at the Hartford Fire Department and lasted for approximately one hour. A general discussion was held on firefighter fitness evaluations as well as the aspects and concerns from both a labor and management viewpoint.

Personal interviews were held with D.A. Shropshire and C.M. Dube, both firefighters with the HFD as well as certified peer fitness trainers through the American Council on Exercise.

Each of the interviews were conducted on October 6, 2005, at the Hartford Fire Department and lasted for approximately ninety minutes. The following questions were asked:

1. What components of physical fitness do you believe should be considered in the evaluation process?
2. Is there a minimum standard firefighters should meet?
3. How often should firefighters be evaluated?

Limitations

Vice-President J.S. Libbey represents the position of the Union because this author currently serves as the unit's President. In order to compose a completely objective review of firefighter physical fitness evaluations, it was necessary for this author to defer any personal opinion until adequate research had been completed.

RESULTS

The overall results of the research questions posed in this study indicate that criteria for national standards surrounding physical fitness have been developed. However, these standards that promote wellness are not commonly used in the State of Vermont, and many departments fail to address physical fitness at all. The stakeholders within the HFD all have similar concerns for the development of criteria for physical fitness. The results to the following research specific questions will help to determine physical fitness criteria for the HFD.

Research Question 1 Results

The National criteria for firefighter fitness evaluations can be found in the NFPA 1583 (2000) Standard on Health-Related Fitness Programs for Fire Fighters. While this Standard is, "not intended to establish physical performance criteria" (NFPA, 2000, 1583-4), it does outline

the components that need to be evaluated during fitness evaluations. According to the Standard, fitness evaluations must address aerobic capacity, body composition, flexibility, muscular strength and muscular endurance. Additionally, NFPA 1583 (2000) requires that, “fitness assessments shall be conducted at least annually” (p. 1583-6).

The IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000) can also be considered as National criteria for firefighter fitness evaluations. In fact, NFPA 1583 (2000) states that these two publications should be used in concert with each other. According to the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000) evaluations need to evaluate aerobic capacity, muscular strength, muscular endurance, and flexibility. However, the Initiative is clear that it has not established any minimum standard. The goal, “is solely for personal fitness improvement” and that improvement is expected with an “assessment and personalized exercise program” (p.53).

The work capacity test for wildland firefighters, also know as the pack test, developed by the USDA (2002), is used to qualify individuals for one the three levels of firefighting duty depending upon their particular assignment. The categories for wildland firefighting duties are arduous, moderate and light. Arduous duty is described as, “field work calling for above-average endurance and superior conditioning” (¶ 4). All personnel who engage in firefighting activities are required to meet the arduous standard, and those assigned to positions such as safety officers, staging officers, helibase managers and fire behavior analysts are required to meet either the moderate or light standard. The pack test measures aerobic capacity, muscular strength, and muscular endurance. In order to meet the fitness requirements of the arduous level of the pack test an individual must complete a three-mile hike wearing a 45-pound pack in 45 minutes (USDA, 2002).

Research Question 2 Results

A telephone interview was conducted with J.G. Wood, Director, Vermont Bureau of Fire. Director Wood stated (personal communication, October 25, 2005) that there are no State criteria for firefighter fitness evaluations. In fact, there is no requirement established by the State surrounding the fitness level of any firefighter. Director Wood stated the only requirements of which he was aware that would even remotely apply are the medical requirements of the OSHA 29CFR1910.134 Standard on Respiratory Protection and the 29CFR1910.156 Fire Brigade Standard. Director Wood supports the development of minimum fitness standards as well as the evaluation criteria that would be required. Director Wood believes that establishing this fitness standard would help to identify those individuals at risk of injury, and then steps could be taken to prevent possible injuries from occurring.

A telephone interview was conducted with R.C. McLeod, Compliance Program Director, Vermont Occupational Safety and Health Administration (VOSHA). According to Director McLeod (personal communication, October 20, 2005) there are no criteria for firefighter fitness evaluations outlined in any VOSHA rules. The only requirement that could even be considered as possibly relating to firefighter fitness is the medical component outlined in the Occupational Safety and Health Administration (2003) 29CFR1910.134 Standard on respiratory protection. This Standard requires employees to be medically fit prior to using a respirator. Medically fit is determined by a licensed health care professional, who in some cases never examines the employee, but rather reviews a questionnaire to determine if a medical examination is necessary.

A telephone interview was conducted with D.A. Notte, Sergeant, Vermont State Police on August 30, 2005. According to Sergeant Notte (personal communication, August 30, 2005), all members of the Vermont State Police must annually pass the fitness test outlined in Appendix

E (Vermont Department of Public Safety, 2005). The Vermont State Police physical agility standards are based upon the Cooper Institute for Aerobic Research, and the minimum standards are based on the 50th percentile for each employee. The standard is adjusted based upon age and gender. Additionally, should an employee fail the exam the first time, he/she is given a letter of reprimand and then can retest. Failure of the second attempt results in the loss of annual leave, and failure of the third attempt leads to discharge.

A personal interview was held with J.M. Estey, Chief, Hartford Police Department on October 24, 2005. Chief Estey (personal communication, October 24, 2005) advised that the Hartford Police Department does not utilize or require any physical fitness standard for their police officers. Chief Estey further stated that while the collective bargaining agreement between the Town of Hartford and the Hartford Police Union allows for the development of a physical fitness testing procedure, one has never been developed. Chief Estey stated that in the near future he could foresee the parties developing a physical fitness standard for the Hartford Police Department.

A telephone interview was conducted with R.L Eppley Chief, Vermont Air Guard Fire Department on October 25, 2005. Chief Eppley (personal communication, October 25, 2005) stated that the firefighters employed at the Vermont Air Guard receive annual physicals in compliance with NFPA 1582 and are currently evaluated on their physical fitness by completing an obstacle course wearing a self-contained breathing apparatus (SCBA). During the obstacle course the firefighter must complete tasks that simulate typical firefighting activities such as hose carry, victim drag, ladder climb, and extinguisher carry. The program is goal based with the objective to complete the stations within 13 minutes. If a participant fails this goal, then he/she is continually re-evaluated without any penalty. Chief Eppley further stated that the Department

of Defense has recently agreed to change this physical fitness evaluation system, and instead use the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative as the recognized evaluation system for military fire departments. Chief Eppley felt this was a positive change.

Research Question 3 Results

In order to determine the criteria used by similar sized departments to evaluate physical fitness, a survey was developed and sent to 50 departments located in four of the New England states. A total of 37 responses were received, and of those, only nine departments indicated they have a formal physical fitness program. The following data was gathered from the nine respondents with a formal physical fitness program. These departments employed between 19 and 74 suppression personnel; with the average number being 36.

The question of whether the physical fitness program is voluntary or mandatory, the respondents answered eight programs were voluntary while only one was mandatory. The question of whether the department conducted physical fitness evaluations on personnel resulted in five departments answering yes, two stated no, and two allowed the option if the employee desired. In terms of how often physical fitness evaluations were conducted, the answers ranged from three departments conduct yearly evaluations, two semi-annual, one quarterly, and three only on initial hiring or when returning from injury. To the question of what components of fitness are evaluated, all respondents replied their evaluations tested strength, endurance, flexibility, and cardiovascular. One survey indicated that the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative evaluation was utilized. The question of whether the department has a minimum fitness standard for firefighters resulted in four yes answers and five no answers. Those that answered yes to the minimum fitness standard indicated that the minimum standard was the IAFF/IAFC Candidate Physical Ability Test. To the question of

whether age was a factor in the department's fitness evaluation, there were four that answered yes and five that answered no.

Research Question 4 Results

In an effort to determine what criteria the HFD should consider implementing for firefighter fitness evaluations is was necessary to ensure all stakeholders were involved. Personnel interviews were held with M.A. Miller, Chief of the HFD, J.S. Libbey, Vice-President of the Hartford Career Firefighters Association and with D.A. Shropshire and C.M. Dube, both firefighters with the HFD as well as certified peer fitness trainers through the American Council on Exercise. Each of these stakeholders agreed that mandatory exercise while on duty will be a necessary component of any physical fitness evaluation program.

According to M.A. Miller (personal communication, October 11, 2005) the criteria for fitness evaluations must be all encompassing and specifically should target aerobic capacity, strength, endurance, and flexibility. Chief Miller further believes that the fitness evaluation system should be non-punitive, flexible, and tailored to meet the needs of the individual. Chief Miller feels it is necessary to initially conduct semi-annual fitness evaluations of all personnel and then transition to a yearly evaluation system in the future. Additionally, Chief Miller concedes, it may be difficult to adopt minimum performance standards for fitness evaluations, and he would initially prefer a system in which the employee was evaluated against him/her self. However, he does believe that after a few years of data collection, it would be possible to establish a minimum fitness standard based upon past results. Chief Miller's greatest concern is that the firefighters be fit for duty and are able to go home at the end of each shift.

Vice-President J.S. Libbey (personal communication, October 12, 2005) believes that the criteria for firefighter fitness evaluations must begin with a positive approach to wellness and

must be administered consistently throughout the entire organization. Confidentiality must also be a priority to ensure the protection of personal information. Additionally, Vice-President Libbey believes that there should not be a minimum standard developed, but rather a continued self-evaluation based upon aerobic capacity, strength and endurance. Vice-President Libbey's greatest concern is the health and safety of the firefighters. He believes that a positive, consistent fitness program including evaluations will decrease the risk of injury to his members.

Peer fitness trainer D.A. Shropshire and C.M Dube were interviewed on their opinions surrounding the criteria for physical fitness evaluations. Both D.A. Shropshire (personal communication, October 6, 2005) and C.M. Dube (personal communication, October 6, 2005) believe that any physical fitness evaluation system should be based upon strength, endurance, aerobic capacity, and flexibility. Additionally, both trainers agree that minimum fitness standards should be established; however, they differ in on what the standard should be. D.A. Shropshire (personal communication, October 6, 2005) believes that to pass the strength portion of the evaluation each member should be able to bench press, dead lift and squat 145 pounds. Endurance is tested by a minimum of 50 non-stop push-ups, and 50 non-stop sit-ups; while aerobic capacity would require at least a stage 7 on the Gerkin treadmill test. C.M. Dube (personal communication, October 6, 2005) feels it is necessary to collect data on baseline evaluations before it is possible to determine what the minimum standard should be. D.A. Shropshire (personal communication, October 6, 2005) supports a quarterly fitness evaluation cycle, while C.M. Dube (personal communication, October 6, 2005) believes a semi-annual evaluation is more than adequate.

Action Research Results

The purpose of this research is to develop and produce criteria for a comprehensive physical fitness evaluation system that can be used to promote physical fitness within the HFD. The memorandum of understanding developed in Appendix F, and the evaluation system outlined in Appendix G is the criteria that this author recommends be adopted. This evaluation system is a slight modification of the evaluation system used in the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000). Individuals will be evaluated against themselves in the areas of aerobic capacity, grip, arm and leg strength, muscular endurance and flexibility. There is neither minimum standard established, nor are there any of the punitive concerns of other testing mechanisms.

The implementation of the evaluation criteria in Appendix G was conducted by taking it directly to the stakeholders. At a meeting of the Hartford Career Firefighters Association on November 10, 2005, the evaluation criteria was discussed and adopted as the system to evaluate physical fitness. A meeting was then held with Chief M.A. Miller on November 15, 2005, in which he also agreed to use the evaluation system in Appendix G as the fitness standard for the HFD. This agreement resulted in the memorandum of understanding outlined in Appendix F.

DISCUSSION

Relationship Between Study Results and Literature

Based upon the information gathered in conducting this research project, this author concludes that the current physical agility exam used by the HFD does not meet the requirements of nationally published standards; nor does it result in a more physically fit fire department. It is

unacceptable that in today's age so little emphasis is being placed on a department's most valuable resource; its members.

However, the issue of physical fitness is being discussed amongst the stakeholders within the HFD, and the parties each agree on the important role it plays. Both M.A. Miller (personal communication, October 11, 2005) and J.S. Libbey (personal communication, October 11, 2005) would like to see a non-punitive physical fitness evaluation system that will result in more physically fit firefighters. This desire is the same as is outlined in the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000) that states the program is, "intended to be implemented as a positive individualized program that is not punitive" (p.1).

Additionally, the stakeholders each agree on which components of physical fitness need to be evaluated. Personal interviews conducted with HFD fitness trainers D.A. Shropshire (October 6, 2005) and C.M. Dube (October 6, 2005) resulted in a consensus on the importance of evaluating strength, endurance, aerobic capacity, and flexibility. The position of the fitness trainers is very much in line with NFPA 1583 (2000), which sets forth that fitness assessments need to be conducted annually and requires an evaluation of aerobic capacity, body composition, muscular strength, muscular endurance, and flexibility. The IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000) also concurs with this position by stating, "fitness evaluations will evaluate four specific areas, aerobic capacity, muscular strength, muscular endurance, and flexibility" (p.52).

Interpretation of Results

An interpretation of the results of this study leads this author to conclude that the HFD, not unlike many fire departments, has not placed enough focus on the issue of physical fitness. The physical fitness agility exam that has been in place for many years was used as a disciplinary

tool, but was never utilized to enhance the fitness levels of the employees. Additionally, the results of surveys that had been distributed to departments of similar size indicate that fitness is not seen as a priority either, since very few had implemented any system to either evaluate the fitness levels of their firefighters or require any physical fitness at all.

The National Fire Protection Agency has developed many Standards that are intended to ensure the health and well-being of firefighters is maintained. Individuals who are considered subject matter experts create these Standards, so they provide a clear direction for any organization to follow. The HFD for all practical purpose has chosen to ignore these Standards, and instead follows and antiquated system that does not meet any of the established criteria.

The Vermont Occupational Safety and Health Administration has not developed any criteria for firefighter fitness evaluations, but simply requires employees to be medically cleared before wearing a respirator, and fit tested annually. While there are a few medical conditions that would prevent an employee from engaging in interior firefighting, there is no effort placed on identifying, preventing, or even reducing injuries that could be prevented through a fitness program.

However, interviews with stakeholders have identified that there is a change in attitude at the HFD, and that now is the time is now to pursue a change to the current system and develop a positive, non-punitive physical fitness evaluation system. This will require an organizational change and the support of all those involved. There is a wide range of possible fitness evaluations that could be used, but those outlined in Appendix G have been developed and tested by the fire service and will meet the needs of the HFD.

Personnel need to be viewed as the valuable resource they are, and every effort must be made to support them. Switching to an evaluation system where the employee is only compared

to him/herself will decrease the fear of failure and instead, motivate the employee to excel. The HFD and its members owe it to themselves and to the citizens they protect to be better prepared, both physically and mentally.

Organizational Implications

One of the greatest organizational implications of the research gathered in the project is that the HFD and the Union are now acutely aware of the requirements of the National Standards, and that the focus should be on healthier employees instead of viewing fitness as a possible disciplinary tool. Each stakeholder has had his/her own reasons for failing to agree on fitness criteria, but the work done in this project has brought all sides together. This will allow the HFD to become a leader in the region in terms of physical fitness and will achieve the goal of healthier firefighters.

The establishment and implementation of the fitness evaluation criteria developed in Appendix G would allow the HFD to comply with the established National Standards relating to physical fitness. NFPA 1500, 1582 and 1583 each set forth criteria that fire departments should use to determine the fitness levels of their employees, and all stakeholders have accepted these criteria. While these Standards are not intended to establish minimum physical fitness performance, they do provide a valuable framework for the HFD.

Finally, the adoption of the fitness criteria in Appendix G would help to meet the concerns of both Chief Miller and Vice-President Libbey. Chief Miller's greatest concern is that the firefighters be fit for duty and are able to go home at the end of each shift, and Vice-President Libbey's greatest concern is the health and safety of the firefighters. By engaging in regular fitness evaluations the employee, the fitness trainers and the employee's physician should be able to spot health concerns before they manifest into a serious career ending injury or illness.

RECOMMENDATIONS

As a result of the research completed in this study, the overall recommendation is that the collective bargaining agreement between the Town of Hartford and the Hartford Career Firefighters Association be altered to allow for a positive, non-punitive physical fitness evaluation program that promotes wellness within the Hartford Fire Department. This change to the fitness evaluation program will be beneficial to both the Town as well as the individual employee. Healthier employees are less likely to become injured in the performance of their duties and stand to have a longer more rewarding life if the total concept of wellness is understood. In order to achieve this, however, several small steps must be accomplished.

This change to a positive, non-punitive physical fitness evaluation program could be accomplished if the Town and the Union would agree to adopt the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000). This Initiative has been accepted as a national standard, and both of the department's fitness trainers are familiar with its requirements.

Once the parties agree to implement the initiative, the next step is to ensure all members are healthy enough to start an exercise regiment. This is accomplished by requiring that all members be sent to a physician for a physical. The physician can then determine if the member can safely exercise without risk of injury or if additional medical attention is needed.

As soon as physicals are completed, the next step is for the peer fitness trainers to conduct baseline evaluations. These confidential evaluations should be conducted based upon the criteria set forth in the IAFF/IAFC Joint Labor Management Wellness-Fitness Initiative (2000), which can be found in Appendix G. Baseline evaluations are necessary to determine the member's current fitness ability and to use in the future to promote individual achievements.

Using the results of the baseline evaluations, the department fitness trainers should then establish individualized fitness programs for each member. The focus of the programs should be to expand on the members' aerobic capacity, strength and flexibility. Since each program will be targeted at the needs of each individual, more program success is likely; so each member should see increased results.

In order to accurately track the individual progress of each member's fitness level, it will be necessary to conduct continued evaluations. Initially, semi-annual fitness evaluations should be conducted for the first two years, and then it is acceptable to switch to annual evaluations. A confidential database should be created to track each member's progress, and only the member, fitness trainer, and the department physician should have access.

Having a fitness evaluation program that focuses on individual achievement instead of a minimum performance standard will create less fear of failure and, instead, place a positive focus on each member's effort to further expand his/her own ability.

It is also recommended that the Town and the Union agree to a requirement that all members exercise during the course of each shift. The duration of the exercise workout should last between 30 and 80 minutes including the warm-up and cool-down period. This is the best way to ensure members stay physically fit and are able to show progress on the physical evaluations. While excise must be a priority for all shift members and the department, it must be understood that do to the nature of the business, there will be shifts when the time is simply not available do to emergencies or other high priority events.

Future readers interested in studying physical fitness evaluation criteria must understand that in order to successfully implement it within your own department, all stakeholders must be included. Additionally, it is critical that the use of nationally accepted standards be utilized in

order to ensure that the program is validated. The fire service has been slow to adopt minimum fitness standards, and it may be difficult to determine what such a criteria should be. However, with progressive, “out of the box” thinking, it is possible to develop a physical fitness criterion that promotes wellness and helps to ensure your firefighters have a long and healthy career.

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APPENDIX A: HARTFORD FIRE DEPARTMENT PHYSICAL AGILITY EXAM

Name: Date:

1. 1.5 mile run in thirteen minutes

   or

   Step Test: Pulse ____ Age ____ Wt. ____ Score ____

   Over Age 40:
   1.5 mile run in 14 minutes
   Step Test Up to age 40 Score 39
   Age 40 to 45 score 35

2. 35 bent knee sit ups in two minutes

3. 7 palm away pull ups or eight second flexed arm hang or 25 push ups

4. Carry 125 lbs. 100’ without stopping

5. Weight transfer-15 pounds, 14 times within 35 seconds

APPENDIX B: COVER LETTER FIRE DEPARTMENT SURVEY

August 30, 2005

Dear Chief:

My name is Steven Locke. I am employed by the Hartford Fire Department in Hartford, Vermont, and am currently enrolled in the National Fire Academy's Executive Fire Officer Program. I am researching physical fitness evaluations for firefighters. As part of my research, I have included a survey on your department's physical fitness program. It would be greatly appreciated if you would please complete the enclosed survey and return it to me no later than September 24, 2005. I have included a self-addressed, stamped envelop for your convenience.

I would like to thank you in advance for your assistance with this research project. Should you have any questions, feel free to contact me. I can be reached at 802-295-3232 or via e-mail at slocke@hartford-vt.org.
.

Sincerely,

Steven Locke

Enclosure: 1

APPENDIX C: FIRE DEPARTMENT PHYSICAL FITNESS SURVEY

Note: The following questions pertain to your departments physical fitness program. Please check the box that most accurately describes your program.

1. Does your department have a formal physical fitness program?

   ☐ Yes ☐ No

Note: If you answered No to question 1, stop here. Please return this survey in the self-addressed envelop, as your answers are an important part of this project.

2. Is the physical fitness program voluntary or mandatory?

   ☐ Voluntary ☐ Mandatory

3. Does your department conduct physical fitness evaluations on personnel?

   ☐ Yes ☐ No

4. How often are physical fitness evaluations conducted?

   ☐ Yearly ☐ Semi-annually ☐ Quarterly ☐ Other

5. If your department conducts physical fitness evaluations, what components of fitness are tested? (check all that apply)

   ☐ Strength ☐ Endurance ☐ Flexibility

   ☐ Cardiovascular ☐ Other

   If other please describe: _____

   _____

6. Does your department have a minimum fitness standard for firefighters? (If yes, please include them in your response.)

   ☐ Yes ☐ No

7. Is age a factor in your department's fitness evaluations?

   ☐ Yes ☐ No

8. How many suppression personnel does your department employ? _____

APPENDIX D: LIST OF FIRE DEPARTMENTS SURVEY MAILED

Rockland Fire Department	Rockland, MA
Agawam Fire Department	Agawam, MA
Amherst Fire Department	Amherst, MA
Ludlow Fire Department	Ludlow, MA
Ware Fire Department	Ware, MA
Southbridge Fire Department	Southbridge, MA
Greenfield Fire Department	Greenfield, MA
Belmont Fire Department	Belmont, MA
Somerset Fire Department	Somerset, MA
Holbrook Fire Department	Holbrook, MA
Hyannis Fire Department	Hyannis, MA
St. Albans Fire Department	St. Albans, VT
St. Johnsbury Fire Department	St. Johnsbury, VT
So. Burlington Fire Department	So, Burlington, VT
Barre City Fire Department	Barre, VT
Montpelier Fire Department	Montpelier, VT
Rutland Fire Department	Rutland, VT
Springfield Fire Department	Springfield, VT
Bellows Falls Fire Department	Bellows Falls, VT
Brattleboro Fire Department	Brattleboro, VT
Lebanon Fire Department	Lebanon, NH
Hudson Fire Department	Hudson, NH
Pelham Fire Department	Pelham, NH
Hanover Fire Department	Hanover, NH
Claremont Fire Department	Claremont, NH
Berlin Fire Department	Berlin, NH
Belmont Fire Department	Belmont, NH

Hookset Fire Department	Hookset, NH
Newport Fire Department	Newport, NH
Bedford Fire Department	Bedford, NH
Derry Fire Department	Derry, NH
Dover Fire Department	Dover, NH
Durham Fire Department	Durham, NH
Laconia Fire Department	Laconia, NH
Londonderry Fire Department	Londonderry, NH
Salem Fire Department	Salem, NH
Somersworth Fire Department	Somersworth, NH
Windham Fire Department	Windham, NH
Wolfeboro Fire Department	Wolfeboro, NH
Plymouth Fire Department	Plymouth, NH
Keene Fire Department	Keene, NH
Bath Fire Department	Bath, ME
Biddeford Fire Department	Biddeford, ME
Gardiner Fire Department	Gardiner, ME
Old Town Fire Department	Old Town, ME
Orono Fire Department	Orono, ME
Sanford Fire Department	Sanford, ME
Old Orchard Beach Fire Dept.	Old Orchard Beach ME
Wells Fire Department	Wells, ME
York Fire Department	York, ME

APPENDIX E: VERMONT STATE POLICE PHYSICAL AGILITY STANDARDS

	SIT-UPS	SIT & REACH	BENCH PRESS[a]	BODY FAT	1.5 MILE RUN	PUSH-UPS
			Ages 20 to 29			
Male	40	17.5	1.06	15.9%	12:18	33
Female	35	20	.65	22.1%	14:55	20
			Ages 30 to 39			
Male	36	16.5	.93	19%	12:51	27
Female	27	19	.57	23.1%	15:26	14
			Ages 40 to 49			
Male	31	15.3	.84	21.1%	13:53	21
Female	22	18	.52	26.4%	16:27	13
			Ages 50 to 55			
Male	26	14.5	.75	22.5%	14:55	15
Female	17	17.9	.46	30.1%	17:24	9

[a] calculated as a percentage of the individuals body weight

APPENDIX F: HFD FITNESS MOU

MEMORANDUM OF UNDERSTANDING

The following MOU between the Town of Hartford and the Hartford Career Firefighters, Local 2905 is to replace Article 20.4 of the Collective Bargaining Agreement.

It is the intention of this MOU and accompanying fitness program to increase the health and wellness of all employees. The results of any fitness evaluation will not be used in support of any disciplinary action.

The Town and the Union agree that all employees will participate in at least 45 minutes of physical fitness training while on duty during the course of each shift. For the purposes of this section a shift is intended to mean either a 10-hour day or 14-hour night. It is understood and accepted that certain mitigating factors such as, multiple emergency calls, training or public education events may not allow for physical fitness activity every shift. However, failure to exercise should be the exception not the rule. Every effort should be made to exercise regularly.

Once the baseline fitness performance of all employees has been determined the department's certified peer fitness trainers will develop an individually tailored fitness program for each employee. The fitness program will address aerobic capacity, muscular strength, endurance, and flexibility.

The department's certified peer fitness trainers will evaluate semi-annually in the months of January and July the individual fitness performance of each employee using either the Gerkin protocol on the treadmill or the FDNY protocol on the stairmill, the handgrip muscle strength evaluation using a hand dynamometer, the leg muscle strength evaluation using the Jackson strength evaluation system, the arm muscle strength evaluation using the Jackson strength evaluation system, push-up evaluation, curl-up evaluation, and the sit & reach protocol to test flexibility. These evaluations can be found in the IAFF/IAFC Joint Labor Management Wellness Fitness Initiative

The department's fitness trainers shall maintain records of all fitness evaluations in a fitness file. These evaluations shall be considered confidential and access will be limited to only the fitness trainers.

If an employee is unable to complete the semi-annual evaluation, it shall be recommended to the employee that he/she see his/her personal physician as soon as possible in order to determine overall health and ability to perform as a firefighter for the Town of Hartford.

If the department's peer fitness trainers recommend that an employee be evaluated by his/her personal physician based upon the inability to complete the semi-annual evaluation or the results of his/her fitness evaluation, then the department's fitness trainer shall document and file the recommendation in the employees confidential fitness file.

APPENDIX G: HFD FITNESS EVALUATION WORKSHEET

Name: _____ Date: _____

Last Medical Exam Date: _____ Age: _____ Weight:_____

Resting Heart Rate: _____
(If greater than 110bpm, provide 5-minute rest, if after rest heart rate is greater than 110bpm postpone evaluation)

Resting Blood Pressure: _____
(If greater than 160/100, provide 5-minute rest; if after rest blood pressure is greater than 160/100 postpone evaluation)

Target Exercise Heart Rate: _____ [(220 – age).85]

Aerobic Capacity Evaluation

Heart rate is monitored continuously throughout the evaluation and during the cool-down period. Heart rate is obtained during the final 15 seconds of each stage and is recorded. Once the individual's heart rate exceeds the target exercise heart rate, the individual continues the evaluation for an additional 15 seconds at the stage where the target heart rate was exceeded. The evaluation is completed and the final stage is reported if the heart rate does not return to, or below, the target exercise heart rate or the individual reaches stage 11.4. The VO_2 max is determined by using the obtained final evaluation stage and the conversion chart. Record the heart rate after one minute cool down.

Stage 1:	4.5 mph, 0% grade	Heart Rate _____
Stage 2:	4.5 mph, 2% grade	Heart Rate _____
Stage 3:	5.0 mph, 2% grade	Heart Rate _____
Stage 4:	5.0 mph, 4% grade	Heart Rate _____
Stage 5:	5.5 mph, 4% grade	Heart Rate _____
Stage 6:	5.5 mph, 6% grade	Heart Rate _____
Stage 7	6.0 mph, 6% grade	Heart Rate _____
Stage 8:	6.0 mph, 8% grade	Heart Rate _____
Stage 9:	6.5 mph, 8% grade	Heart Rate _____
Stage 10:	6.5 mph, 10% grade	Heart Rate _____
Stage 11:	7.0 mph, 0% grade	Heart Rate _____

Stage Completed: _____ Converted VO_2 Max (from Chart): _____
Time Evaluation Terminated:_____ Heart rate after cool down period: _____

VO_2 Conversion Chart

Stage	Time	Converted VO_2 Max
1	1:00	31.15
2.1	1:15	32.55
2.2	1:30	33.6
2.3	1:45	34.65
2.4	2:00	35.35
3.1	2:15	37.45
3.2	2:30	39.55
3.3	2:45	41.30
3.4	3:00	43.4
4.1	3:15	44.1
4.2	3:30	45.15
4.3	3:45	46.2
4.4	4:00	46.5
5.1	4:15	48.6
5.2	4:30	50
5.3	4:45	51.4
5.4	5:00	52.8
6.1	5:15	53.9
6.2	5:30	54.9
6.3	5:45	56
6.4	6:00	57
7.1	6:15	57.7
7.2	6:30	58.8
7.3	6:45	60.2
7.4	7:00	61.2
8.1	7:15	62.3
8.2	7:30	63.3
8.3	7:45	64
8.4	8:00	65
9.1	8:15	66.5
9.2	8:30	68.2
9.3	8:45	69
9.4	9:00	70.7
10.1	9:15	72.1
10.2	9:30	73.1
10.3	9:45	73.8
10.4	10:00	74.9
11.1	10:15	76.3
11.2	10:30	77.7
11.3	10:45	79.1
11.4	11:00	80

Strength Evaluation – Grip

Dominate Hand:_____Left / _____ Right

Trial 1, Left Hand: _____ kilograms Trial 1, Right Hand: _____ kilograms

Trial 2, Left Hand: _____ kilograms Trial 2, Right Hand: _____ kilograms

Trial 3, Left Hand: _____ kilograms Trial 3, Right Hand: _____ kilograms

Highest Grip Strength Score:_____

Strength Evaluation – Leg

Trial 1: _____ kilograms

Trial 2: _____ kilograms

Trial 3: _____ kilograms

Highest leg Strength Score: _____

Strength Evaluation – Arm

Trial 1: _____ kilograms

Trial 2: _____ kilograms

Trial 3: _____ kilograms

Highest Arm Strength Score: _____

Endurance Evaluation

Number of successfully completed push-ups:_____

Number of successfully completed sit-ups:_____

Flexibility Evaluation – Sit and Reach

Trial 1: _____ inches

Trial 2: _____ inches

Trial 3: _____ inches

Furthest distance:_____ inches